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**REVIEW OF  
FEASIBILITY STUDY REPORT  
JOHNS-MANVILLE DISPOSAL AREA  
WAUKEGAN, ILLINOIS**

**REVISED LETTER REPORT**

**Prepared for**

**U.S. ENVIRONMENTAL PROTECTION AGENCY  
Office of Waste Programs Enforcement  
Washington, D.C. 20460**

Work Assignment No. : 234  
EPA Region : 5  
Site No. : 54A5 (C)  
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## **INTRODUCTION**

Johns-Manville Sales Corporation (now Manville Sales Corporation) is conducting a Remedial Investigation/Feasibility Study (RI/FS) for the 120-acre waste disposal area at its Waukegan, Illinois manufacturing plant. Manville is performing this work under the terms of a Consent Order with U.S. EPA Region 5 that was signed on June 14, 1984 (United States Bankruptcy Court, 1984). EPA approved the RI report (KMA, 1985a) in November 1985. In December 1985, Manville and their consultant, Kumar Malhotra & Associates, Inc. (KMA), held preliminary discussions with EPA concerning potential remedial alternatives for the site. Manville and KMA submitted a Feasibility Study Report that evaluates these alternatives in February 1986 (KMA, 1986).

PRC Environmental Management, Inc. and INTERA Technologies, Inc. previously reviewed the draft and final RI reports for the site and took part in the preliminary discussions of remedial alternatives. As part of our continuing assistance to EPA under TES 2 Work Assignment No. 234, PRC and INTERA reviewed the FS report. We considered the following factors in this review:

- o Effectiveness of remedial alternatives in eliminating environmental releases from the site
- o Technical adequacy of remedial alternatives and applicability to site conditions
- o Compliance of remedial alternatives with requirements of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (U.S. EPA, 1985b)

In addition, we evaluated the report for conformance with EPA's Guidance on Feasibility Studies under CERCLA (U.S. EPA, 1985a) and with the terms of the Consent Order.

## **DISCUSSION**

The disposal area comprises 120 acres of the 300-acre Waukegan plant site. There are four currently active units within the disposal area:

- o A series of unlined settling and filtration basins that treat and recycle process wastewater
- o A disposal pit for sludge removed from the settling basins

- o An asbestos disposal pit
- o A disposal pit for non-asbestos plant wastes

PRC and INTERA assumed in this review that the four active units do not treat or dispose of hazardous wastes as defined under RCRA (40 CFR 261). We also assumed that these units are managed in compliance with all applicable federal, state, and local regulations, since it is beyond the scope of work for this assignment to make such a determination.

The FS report (KMA, 1986) presents an accurate summary of the problems caused by past waste disposal practices at the Manville Waukegan plant. The major problem identified in the RI report (KMA, 1985a) is the airborne dispersal of contaminants from the site. Air emissions are caused by current activities in the disposal area or by wind erosion of inactive portions of the disposal area. The RI report identified asbestos and lead as the contaminants of most concern. Air monitoring studies conducted during the RI showed elevated on-site air concentrations of asbestos compared to off-site concentrations. Lead concentrations in air were measured in a separate study (KMA, 1985b). These study results indicated that on-site air concentrations of lead were no higher than off-site concentrations. All lead concentrations measured were below the National Ambient Air Quality Standard for lead of 1.5 ug/m<sup>3</sup>.

The RI also investigated potential ground-water contamination at the site. The potential sources of contamination were identified as process water seepage from the settling ponds, infiltration to the ground water through the sludge disposal pit, and infiltration to the ground water through soils containing contaminants such as lead.

Sampling results subsequent to the RI report indicated that the process water was of relatively good quality (KMA, 1985b). A complete ion analysis was not performed, so the process water might still contain constituents that have not been identified. However, no major ions seemed to be missing from the analysis, and contaminants of most concern, metal cations and organics, had negligible concentrations. Thus, seepage of process water to the ground water should be of little concern in designing remedial alternatives.

Seepage or infiltration through the sludge pit was not demonstrated to have a significant effect on ground-water quality. However, sample results from the two monitoring wells closest to the sludge disposal area indicate higher total dissolved solids (specific conductivity) and carbonate contents than samples from the other three on-site wells.

The FS report presents a detailed evaluation of five remedial alternatives. These alternatives were developed to fit the five categories of remedial alternatives required by 40 CFR 300.68(f). The categories and alternatives are as follows:

1. No action alternative. The no action alternative proposed by the FS report includes provisions for ground-water monitoring of the waste disposal area.
2. An appropriate alternative that does not attain applicable or relevant standards. The FS report proposes grading the site, applying a 3-inch soil cover on most surfaces, followed by fertilizing and seeding.
3. An alternative that attains applicable or relevant standards. The FS report proposes grading the site, applying a 6-inch compacted cover on most surfaces, applying a 3-inch cover of top soil, followed by fertilizing and seeding. The 6-inch compacted cover meets the requirements for inactive asbestos disposal areas as specified by the National Emission Standards for Hazardous Air Pollutants (NESHAP) in 40 CFR 61.153.
4. An alternative that exceeds applicable or relevant standards. The FS report proposes constructing an on-site landfill. All wastes in the disposal area would be excavated and placed in this landfill. The landfill will be designed to meet RCRA double liner requirements and will include leachate collection and detection systems.
5. An alternative for treatment or disposal at an off-site facility. The FS report proposes excavating all wastes within the disposal area and transporting these wastes to an off-site landfill.

The FS report evaluates each alternative in detail according to the criteria outlined in 40 CFR 300.68(h). These criteria include cost (including operation and maintenance costs), technical feasibility, effectiveness in minimizing threats to the environment, adverse effects of implementing the alternative, compliance with

regulations and standards, and time required to implement the alternative. This evaluation appears to comply fully with the requirements of the NCP. Additionally, the FS report covers all considerations required by EPA's Guidance on Feasibility Studies under CERCLA and the requirements stipulated in paragraph IV of the Consent Order.

The FS report recommends that the third alternative listed above be chosen for remedial action at the site. This alternative (6-inch compacted soil cover followed by top soil and revegetation) will address inactive portions of the 120-acre disposal area; the waste management units within the disposal area that are currently used will remain active. The soil cover and vegetation alternative would reduce future releases of airborne contaminants from the disposal area, assuming that the cover and vegetation are adequately maintained.

This alternative will also provide some measure of ground-water protection. The compacted cover and the regrading of the site will reduce infiltration of precipitation. The alternative includes annual surface and ground-water monitoring for a period of 30 years. Thus, there would be some means to detect potential future ground-water problems. Although the alternatives for on-site and off-site land-filling would provide greater ground-water protection, they would also require more extensive excavation of the site. This could lead to increased air emissions of asbestos during remedial action, offsetting some of ground-water protection benefits.

During this work assignment, we also reviewed EPA CERCLA enforcement actions that have been taken at other asbestos disposal areas. Our review included NPL, proposed NPL, and non-NPL sites in EPA Regions 1, 2, 3, and 9. Although few of these sites have gone completely through the RI/FS process, several sites are now in the early stages of an RI. At most of the sites, EPA has taken removal actions under 40 CFR 300.65.

All removal actions and remedial actions that we reviewed consisted of the application of cover over the asbestos disposal sites. We are not aware of any site where EPA required a large scale excavation of disposed asbestos-containing material. The depth of soil cover applied to the various sites has ranged from 6 inches to 5 feet. In most cases, EPA has required a cover in excess of the minimum 6-inch thickness

plus vegetation specified by NESHAP. EPA has been reluctant to accept the NESHAP minimum cover because of concerns about the long-term effects of erosion and continued site use (Dalton, 1985).

Recent guidance issued by EPA's Office of Solid Waste (OSW) (U.S. EPA, 1985c) recommends a minimum cover thickness of 30 inches for final closure of an asbestos disposal area. This recommendation is based partly on work done by the Army Corps of Engineers (COE) at the Cold Regions Research Laboratory in Hanover, New Hampshire. Research has shown that the action of freezing and thawing of the ground can cause an upward migration of pebbles, rocks, and asbestos-containing materials. As a result, the COE recommended a 30-inch cover for New England asbestos sites (Dalton, 1985; Groulx, 1986). To prevent freeze-thaw effects, the top of the asbestos layer should be below the mean freeze line in the soil after the cover has been installed.

The remedial alternative recommended by the FS report is consistent with previous EPA enforcement actions at asbestos sites in that it leaves the waste in place. However, the thickness of the proposed cover is not consistent with recent OSW guidance and with most other removal and remedial actions implemented under CERCLA. The Johns-Manville disposal area is located in an area that has a climate similar to that of New England. Thus, the COE recommendations concerning freeze-thaw effects should also be considered. In light of all of these factors, it may be appropriate to apply a cover thicker than the one recommended by the FS report.

Covering with vegetation appears to be the most cost-effective remedial action. It provides substantially equivalent protection to either of the landfilling alternatives at a much lower cost. KMA's recommended alternative is estimated to cost \$3.1 million (present worth, discounted at 10 percent over 30 years). This is more than an order-of-magnitude lower than the estimated costs for on-site landfilling (\$38.6 million) or off-site landfilling (\$70.6 million). Increasing the thickness of the cover would increase the cost of the recommended alternative; however, the cost would still be lower than either of the landfilling alternatives.

We would suggest two additional measures to improve the alternative recommended by the FS report. First, the alternative calls for air monitoring by means of personal samplers during waste handling and grading operations. The purpose of this monitor-

ing is to evaluate worker exposures on-site. We suggest the addition of ambient air monitoring at the plant property lines or at the edges of the disposal area. This would allow Manville to assess the potential for off-site migration of airborne asbestos during remedial activities, since this is equally of concern. If the results of this monitoring indicate problems, dust control measures for waste handling and grading could be adjusted accordingly. Second, if the sludge disposal area will be closed in the near future, we suggest that a cover of reduced permeability (higher clay content) be considered for this area. Of the active waste disposal units, the sludge disposal area seems to be the most likely potential source of future groundwater contamination. Application of a reduced permeability cover would add a level of protection at little additional cost.

Additional specific comments concerning the Feasibility Study Report are included in Attachment A to this report.

#### SUMMARY

The Feasibility Study Report submitted by Manville and KMA satisfies applicable requirements of the NCP, EPA's Guidance on Feasibility Studies under CERCLA, and the terms of the Consent Order between Manville and U.S. EPA Region 5. With the exception of the no action alternative, all alternatives should reduce air emissions of asbestos from the disposal area. This was the primary concern identified during the RI for this site. Ground-water protection is a secondary concern at the site since sampling results to date have shown negligible contamination. Again, with the exception of the no action alternative, all proposed remedial alternatives should provide some measure of ground-water protection. The on-site and off-site landfilling would provide the greatest ground-water protection but would also have the largest negative impact during implementation.

KMA selected "soil covering with vegetation" as the recommended remedial alternative. This alternative involves regrading the inactive areas of the site and applying a 6-inch compacted soil cover that complies with NESHAP requirements. This would be followed by a 3-inch top soil layer that would be revegetated with grass and shrubs. The alternative also includes ground-water monitoring of the disposal area and surface water monitoring of Lake Michigan for up to 30 years. The soil

covering with vegetation alternative addresses the site problems indentified during the RI. Estimated costs for this alternative are substantially lower than either of the landfilling alternatives.

We agree that covering the asbestos-containing waste in place is preferrable to the large scale excavation that would be required for off-site or on-site landfilling. However, the thickness of the cover proposed in the FS is not consistent with recent Office of Solid Waste guidance on final closure of asbestos disposal areas. This guidance recommends a minimum cover thickness of 30 inches. In previous CERCLA enforcement cases involving asbestos disposal sites, EPA has generally required a cover thicker than the one proposed in the FS. We recommend that the FS consider an additional remedial alternative. This alternative should include a thicker cover that is more in line with EPA policy and guidance.



## REFERENCES

- Dalton, D.S., 1985. U.S. EPA Enforcement Approach to Asbestos Site Cleanup, in The 6th National Conference on Management of Uncontrolled Hazardous Waste Sites, Hazardous Materials Control Research Institute, Washington, DC. November 4-6.
- Groulx, Paul, 1986. On-Scene Coordinator, U.S. EPA Region 1, telephone conversation with John Dirgo, Environmental Scientist, PRC Environmental Management, Inc. March 24.
- Kumar Malhotra & Associates, Inc., 1985a. Final Remedial Investigation Report, Johns-Manville Disposal Area, Waukegan, Illinois. July.
- Kumar Malhotra & Associates, Inc., 1985b. Technical Memorandum # M-2, Analysis of Common Inorganic Anions in Surface and Ground Water and Ambient Air Quality Monitoring for Lead and TSP. September.
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- U.S. Environmental Protection Agency, 1985a. Guidance on Feasibility Studies under CERCLA. Washington, D.C.
- U.S. Environmental Protection Agency, 1985b. National Oil and Hazardous Substances Pollution Contingency Plan; Final Rule. 50 Federal Register 47912. November 20.
- U.S. Environmental Protection Agency, 1985c. Asbestos Waste Management Guidance: Generation, Transport, Disposal. Office of Solid Waste, Washington, DC. EPA/530-SW-85-007.

**ATTACHMENT A**  
**SPECIFIC COMMENTS ON**  
**FEASIBILITY STUDY REPORT**  
**JOHNS-MANVILLE DISPOSAL AREA**  
**WAUKEGAN, ILLINOIS**

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Page	Comment
1-1	We do not agree with the statement (2nd paragraph) that on-site air quality does not appear to be affected by releases of asbestos. The fact that asbestos concentrations were higher on-site than off-site indicates that there is some air quality impact, even if this impact is small.
2-5	Previous statements (page 2-1) indicated that asbestos fibers are no longer used in manufacturing processes at the Johns-Manville Waukegan plant. If this is true, it is not clear why the asbestos disposal pit continues to receive asbestos waste (1st paragraph). The report should identify the source of this asbestos waste. This comment also applies to the last paragraph on page 2-10.
2-15	The second paragraph should probably be revised. It now reads "There is no migration of any contaminant from the site." We feel that the statement "Based on monitoring data collected during and after the RI, there is no current evidence that contaminants are migrating from the site" is more appropriate.
2-16	The first paragraph should also state that lead is released from the disposal area to ambient air, even though monitoring data have shown that the quantity released is small.
3-12	<p>There is no current evidence to suggest that the inorganic lead found at the Manville disposal site is a human or animal carcinogen. The first paragraph should be revised accordingly.</p> <p>The statement in the last paragraph that ground water "is not of concern at this site" should probably be revised. An appropriate revision would be "ground-water contamination does not appear to be a problem at this site at this time."</p>
4-4	The description of grading and drainage near the waste disposal pits (1st and 3rd paragraphs) need to be clarified. The report seems to suggest that runoff will be channeled into the disposal pits. It would be more appropriate to reduce infiltration through these areas by directing runoff away from the disposal pits.
4-5	The plan to test soils brought to the site for contamination (3rd paragraph) is a good one. Specific criteria for accepting or rejecting the soil can be defined at a later time.
4-6	The OSHA standards for asbestos are reported incorrectly in the first paragraph. The numbers are correct, but the units are in error. The standards should be expressed in fibers per cubic centimeter.

- 5-7 Information appears to be missing from the first numbered item on this page. It is not clear why the Clean Water Act is mentioned here since it is not included in the subsequent discussion.
- 5-8 In the section concerning RCRA Compliance, additional sections of RCRA may be relevant and appropriate (although not legally applicable) to the remedial alternatives that are proposed. These sections would include portions of Subparts G (Closure and Post-Closure) and N (Landfills) of 40 CFR 264 and 265.
- 5-10 The score of 0 for "OSHA Compliance" for the landfilling alternatives is questionable. However, changing this score would probably not affect the relative rankings of the alternatives.
- 5-14 We do not understand the reasons for the large differences in scores for the various alternatives under "Compliance with Water Quality Requirements During Implementation."
- 5-19 Some of the scores for "Improvements in Biological Environment" are questionable. However, changes in the scores would probably not affect the relative rankings of the alternatives.